

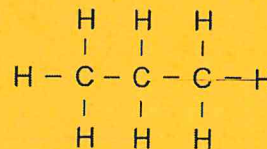
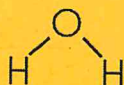
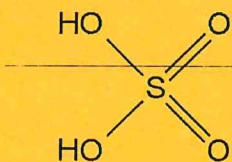
**Topics on this Test:****Make sure you know the vocabulary terms and definitions!**

	Big Idea	Vocabulary
PS1-1	Describe the atomic composition of simple molecules and extended structures.	atom, molecule, matter, extended structure, pure substance
PS1-2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	chemical reaction, reactant, product, pure substance, physical property, chemical property, volume, mass, density, melting point, boiling point, solubility, flammability, odor
PS1-3	Describe that synthetic materials come from natural resources and impact society.	synthetic material
PS1-5	Describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.	conservation, Law of Conservation of Matter
PS1-6	Understand how a device can release or absorb thermal energy by chemical processes.	thermal energy, endothermic, exothermic

Be able to answer all of the questions in each Study Section below.

**Study Section PS1-1: Atoms and Molecules**

1. What is matter made of? **Matter is made of atoms and molecules.**
2. Match each molecule to its molecular formula below:





3. Identify each of the extended structures below:

Choices: graphite, diamond, table salt

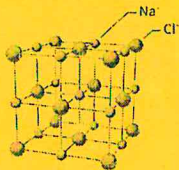
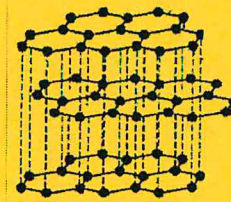


Table salt



diamond



graphite

4. What is a pure substance? Give 2 examples. **Something that is made from all the same atoms or the same molecules. Examples: a glass of water (pure water, no other molecules); a helium balloon, table salt, diamond, graphite, an iron pipe, etc.**

#### **Study Section PS1-2: Properties and Changes in Matter**

1. Explain why a bubble will float to the top of a glass of water, but a rock will drop to the bottom. **A bubble will float to the top of water because it is less dense than the water. A rock will drop to the bottom because it is more dense than water. Less dense things rise up in more dense things.**
2. What makes one substance's properties different from another? (for example, why is water a liquid and carbon dioxide is a gas?) **The combination and arrangement of atoms in a substance's molecules determine the properties of that substance.**
3. Give 3 examples of physical properties and 3 examples of chemical properties. **Physical properties can be observed and measured without changing the substance into something new. Examples: mass, volume, density, melting point, boiling point, odor, color, solubility, etc. Chemical properties can only be observed during or after a chemical change. They describe how a substance becomes a new substance. Examples: acidity, reactivity, flammability, etc.**
4. When sulfuric acid is poured on sugar, a chemical reaction occurs. List physical and chemical properties of each substance before the reaction occurred and properties of the substance after.



a. Properties of the Reactants:

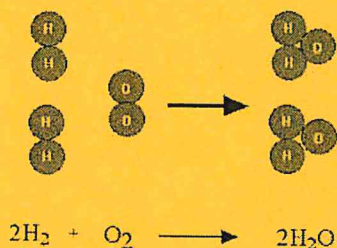
- i. sugar- **white, crystallized powder**
- ii. acid- **clear liquid**

b. Properties of the Product: **black, volume increases**

5. What happens to the atoms and molecules when a chemical reaction occurs?

**The atoms in the reactant molecules rearrange to form new molecules (the products). New molecules are formed, but no new atoms are formed.**

6. Explain what happens to the reactants in this chemical equation.



**The atoms in the hydrogen and oxygen molecules (reactants) separate and rearrange to form the water molecules (products).**

7. Look at the properties before and after. Has a chemical change occurred? **yes / no- yes, because the gas and ash are new substances; also, light and sound (forms of energy) are given off.**

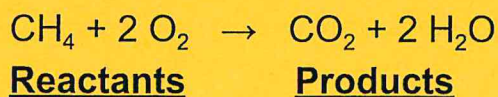
Properties Before	Properties After
grey-black	black
powdered solid	gas and ash
	bright light and loud sound produced

8. Look at the properties before and after. Has a chemical change occurred? **yes / no- no, only the shape has changed. The substance has not become something new.**

Properties Before	Properties After
brown, shiny metal	brown, shiny metal
malleable and ductile	malleable and ductile
straight wire	curved into coils



8. In the equation below, label the reactants and the products.



### **Study Section PS1-3: Synthetic Materials**

1. How is a synthetic material different from a natural material? **Synthetic materials are made in a lab from raw materials (natural resources). A natural material is made in nature.**
2. Explain how a synthetic material is formed. **A synthetic material is made from a natural resource that has been altered through chemical reactions. Example: plastic (synthetic material) is made from petroleum (natural resource).**

### **Study Section PS 1-5: Law of Conservation of Matter**

1. What does the Law of Conservation of Matter say about atoms? **In a chemical reaction, no atoms are gained or lost, they are just rearranged.**
2. What does the Law of Conservation of Matter say about mass? **In a chemical reaction, the mass of the products is equal to the mass of the reactants.**
3. In a chemical reaction, atoms are not created or destroyed, they are just **rearranged.**
4. Look at the equation below.

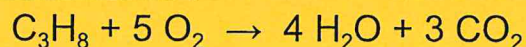


How many different types of atoms (elements) are in this equation? **3- C,H,O**

How many total atoms are in this equation? **9 (the reactants become the products- no new atoms are added)**

How many atoms of each element? **1 C, 4 H, 4 O**

5. Tell the number of each type of atom in the equation below.



LEFT: C **3** H **8** O **10** → RIGHT: C **3** H **8** O **10**

6. Which of the molecules below could be a product for the reactants:  $2 \text{Hg} + \text{O}_2$

How do you know? **C because the number and type of atoms matches**

- a.  $3 \text{Hg}_2\text{O}_6$
- b.  $\text{H}_2\text{SO}_4$
- c.  $2 \text{HgO}$
- d.  $\text{HgCl}_3$

8. Which of the pairs of compounds below could be the reactants for the product:

$2 \text{SO}_3$  How do you know? **B because the number and type of atoms matches**

- a.  $\text{CO}_2 + \text{H}_2\text{O}$
- b.  $2 \text{SO}_2 + \text{O}_2$
- c.  $\text{H}_2\text{O} + \text{SO}_4$
- d.  $\text{NaCl} + \text{O}_2$

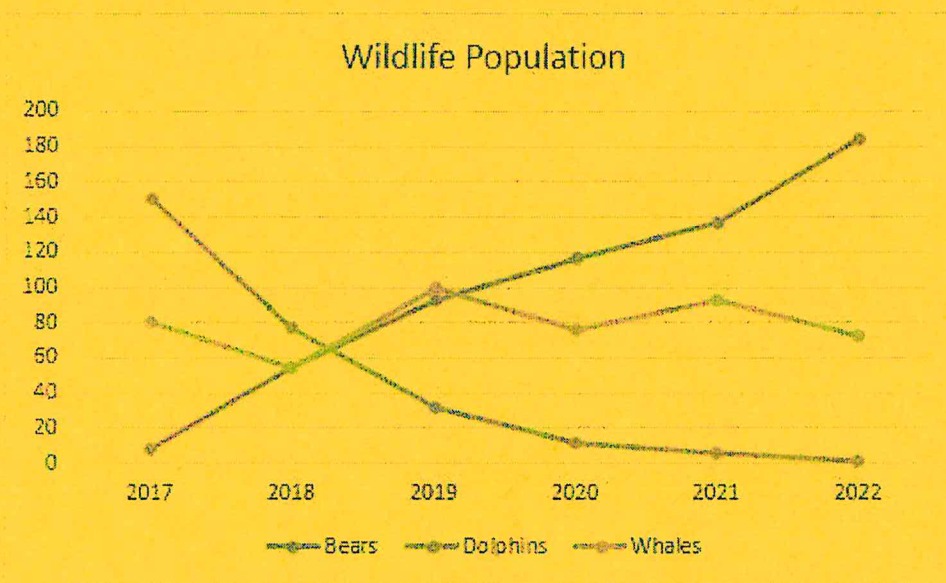
### **Study Section PS 1-6 Endothermic and Exothermic Reactions**

1. An endothermic reaction **takes in** heat to/**from** the environment.
  - a. It feels **cool** to the touch.
  - b. The temperature **decreases**.
2. An exothermic reaction **releases** heat **to**/from the environment.
  - a. It feels **warm** to the touch.
  - b. The temperature **increases**.
3. Review the Hand Warmer Experiment and analyze the graphs.



### Graph Interpretation

Analyze the following graph, and answer the questions about it.



1. Which species has the greatest population overall? **bears**
2. Which species
  - a. Increase throughout the time period? **bears**
  - b. Decreased throughout the time period? **dolphins**
  - c. Both decreased and increased throughout the time period? **whales**
3. In 2019, which species had the greatest population? **whales**
4. What would the trendline look like if a species' population did not change over several years? **Flat horizontal line**